

action of the *impact* of water on the film; which *impact* has been regarded as essential to the proper washing of the plate. I find that in the entire series of about 200 plates, seven have exhibited minute but noticeable traces of this dislocation; these have been rejected in the above investigation.

University Observatory, Oxford:
Jan. 13, 1887.

Photographs of Nebulae in Orion and in the Pleiades.
By Isaac Roberts.

The accompanying photograph of nebulae in *Orion* is enlarged five times from a negative which I took on November 30 last, between 4^h 13^m and 5^h 20^m sidereal time at Maghull. The exposure was intended to extend to two hours, but an accident stopped it after 1^h 7^m, and clouds have prevented another photograph being taken since that date.

The photographic extensions of the nebulae may be judged by comparing this photograph with that taken by Mr. Common, and referring to the included and surrounding stars in them respectively, as places from which to measure.

It will thus be seen that the dark space shown on Mr. Common's photograph between the small nebula (Herschel, No. 1185) and the Great Nebula, as well as the "fish mouth," are filled with dense nebulous matter, which also can clearly be traced between Declination $-5^{\circ} 15'$ and $-6^{\circ} 15'$. In Right Ascension it can be traced between 5^h 26^m and 5^h 29^m—an area about seven times that covered by Mr. Common's photograph.

There is a large, dense, and characteristically marked nebula to the north (Herschel, No. 1180), and the photograph indicates very faint nebulosity stretching some distance between this and the Great Nebula, but hitherto, owing to continuous bad weather, there has been no opportunity for proving by a long exposure of plates that this nebula also forms a part of the Great Nebula. If this should be proved, and there is now reasonable ground for inference, then extensions of the nebula will be revealed to us on a scale still more vast than has hitherto been known.

In the accompanying print the central parts of the nebulae are white, without any shading, but on the negatives, when they are examined by the eye or under a microscope, those parts are full of detail, and delicate, but dense, cloud-like, curdling masses. I hope that, some time before the close of this session, I may have clear sky to enable me to present to the Society photographic analyses of this nebula, which will show the appearances presented by it with different lengths of exposure.

This method will give a more accurate insight into its constitution, and will furnish more reliable means for detecting any

changes that may take place within it in future, than if I were to force out the details on a print from one dense negative. I already have some of the negatives which will be required in the demonstrations here proposed.*

Nebula in the Pleiades.

The accompanying photograph was taken on December 29 (last month), between sidereal time at Maghull $2^h\ 55^m$, and $6^h\ 1^m$. The actual time of the exposure of the plate was three hours.

In bringing before the Society the first and second of the series of photographs of these nebulae, I stated that upon one of them there were traces of nebulosity which indicated that the principal stars in the *Pleiades* are involved, or are in alignment with one vast nebula, and this photograph seems to prove the correctness of the inference.

The nebula (I now venture to use the singular) is traceable from the north of *Asterope*, and extends southwards $1^\circ\ 10'$. It includes *Taygeta*, *Maia*, *Celæna*, *Electra*, *Alcyone*, *Merope*, and numerous other small stars within itself.

On the north side of *Alcyone* is a dense mass of light, with a dark space between it and the star. The negative shows that it is not due to the contiguous blister on the glass plate. The nebulosity round *Maia* is characterised by broad streamers stretching in northerly and southerly directions; whilst round *Merope* somewhat similar streamers have n.p. to s.f. directions.

From *Electra* stretches a pointed streamer, which can be traced as far as a line drawn from *Maia* to *Merope*, and a little distance further south is another streamer resembling a detached nebulous straight line. These, and many other points, will be clearly seen on examination of the photograph, but much more clearly are they shown on the negatives. These appearances are both new and unexpected, and it is essential that the evidence of their reality should be so clear that it cannot reasonably be doubted. To this end I have taken already six photographs on different dates. The first was on October 23, 1886, with an exposure of $1^h\ 29^m$, and that showed all the features which are indicated on the chart prepared by MM. Henry at the Paris Observatory, and, in addition, large extensions of nebulous matter round *Maia* and *Merope*.

The second photograph was taken on the following night, October 24, with an exposure of three hours, and it showed vast extensions of nebulous matter round, between, and beyond *Alcyone*, *Merope*, *Electra*, *Maia*, *Taygeta*, *Asterope*, and other smaller stars.

These photographs were presented to the Society in November. On October 25, and December 16 and 24, I obtained one negative each night, but the sky was more or less misty, and at

* The short lines upon the photograph were caused by an accidental momentary movement of the instrument during the exposure of the plate.

times cloudy, during the exposure on each occasion, and consequently the nebulæ are not well developed, but what is shown confirms the features on the other negatives.

On December 29 I obtained the sixth negative, an enlargement of which I now present to the Society, and have already given in these notes a brief description of its general appearance.

The photographs are placed in the Library.

A New Variable Star in Puppis. By A. Stanley Williams.

The variability of the star L. 3105 in *Puppis* does not seem to have attracted attention hitherto. Whilst in southern latitudes last winter, I paid considerable attention to the magnitudes of the stars, and on February 17, 1886, noticed it as being exactly equal in brightness to the neighbouring star L. 3069. Upon referring to some previous determinations of magnitude I found that it had been rated both brighter and fainter than this star, and as these two stars had always been observed for magnitude at the same time, there seemed to be a reasonable suspicion that one or other of them was variable, and they were consequently kept under examination. Further observations soon showed that this suspicion was correct, and that L. 3105 is the variable star. The following table gives all the determinations of magnitude of these two stars which I was able to obtain.

Date. 1885.	Estimated Mags.		Remarks.
	L. 3069.	L. 3105.	
Nov. 14	5·05	5·4	
21	4·7	4·4	
1886.			
Feb. 12	4·7	4·55	L. 3105 distinctly a little brighter than L. 3069.
17	4·5	4·5	The two stars exactly equal.
21	4·7	4·7	Equal.
Mar. 16	4·7	4·9	L. 3069 distinctly a little brighter than L. 3105.
21	4·8	5·2	L. 3069 <i>distinctly</i> and <i>considerably</i> brighter than L. 3105.
22	4·9	4·7	L. 3105 distinctly brighter than L. 3069.
30	5·2	5·4	The relative brightness probably more exactly estimated than the actual determinations of brightness, the stars being very low. Two or three days previous L. 3069 was seen distinctly superior to L. 3105, but the date was not registered.